

What Is Claimed Is:

1. A method of direct memory access control, comprising:  
receiving a command to initiate data transfer between a first device and a  
second device;  
responsive to the command received, determining a channel capable of  
facilitating the data transfer;  
determining a mode indicating a manner in which to activate the channel;  
and  
enabling the data transfer to be performed using the channel and based on  
the mode determined.
2. The method according to Claim 1, wherein the one of the first device and the  
second device comprises a memory device.
3. The method according to Claim 1, further comprising:  
receiving a signal indicating a last transfer associated with the data  
transfer; and  
in response, transmitting a signal acknowledging completion of the data  
transfer.

1 4. The method according to Claim 1, wherein determining a mode indicating a  
2 manner in which to activate the channel comprises:

3 selecting the mode from one of a group of operation modes comprising a  
4 fixed length single burst mode, a chaining mode, an auto-rollback  
5 mode, virtual channel mode, and a multiple-segment mode.

1 5. The method according to Claim 1, wherein determining a mode indicating a  
2 manner in which to activate the channel comprises:

3 selecting the mode from one of a group of access modes comprising  
4 READ and WRITE modes.

1 6. The method according to Claim 1, further comprising:

2 determining a base address representing a starting address of the data  
3 transfer.

1 7. The method according to Claim 6, further comprising:

2 selecting a starting address of a subsequent data transfer to be the base  
3 address.

1 8. The method according to Claim 6, further comprising:

2 selecting a starting address of a subsequent data transfer to be an address  
3 that is continuous with an ending address of a previous data  
4 transfer.

1 9. The method according to Claim 6, further comprising:  
 2 determining an ending address contiguous to the starting address; and  
 3 automatically rolling the ending address to the starting address when the  
 4 data transfer exceeds the ending address.

1 10. The method according to Claim 1, further comprising:  
 2 determining a segment count indicator and a segment spacing indicator  
 3 from the operational characteristics, wherein the data transfer  
 4 comprises data transfer of a plurality of data segments.

1 11. The method according to Claim 10, further comprising:  
 2 determining a base address representing a starting address of a first data  
 3 segment;  
 4 selecting a starting address of a subsequent data segment to be an address  
 5 determined from the base address offset based on the segment  
 6 count indicator and the segment spacing indicator.

1 12. A method of selectably enabling a plurality of data transfer modes along one  
 2 or more channels, comprising:  
 3 loading predetermined configuration data from an external device, the  
 4 predetermined configuration data including the plurality of data  
 5 transfer modes and the channels facilitating the data transfer;  
 6 receiving a command to initiate the data transfer between a source device

7 and a destination device;  
8 responsive to the command received, selecting a corresponding channel  
9 from the channels and a corresponding mode from the plurality of  
10 data transfer modes; and  
11 enabling data transfer between the source device and the destination  
12 device based on the corresponding channel and the corresponding  
13 mode.

1 13. The method according to Claim 12, wherein selecting a corresponding mode  
2 from the plurality of data transfer modes comprises:  
3 selecting the corresponding mode to be one from a group of operation  
4 modes comprising a fixed length single burst mode, a chaining  
5 mode, an auto-rollback mode, virtual channel mode, and a  
6 multiple-segment mode.

1 14. The method according to Claim 12, wherein selecting a corresponding mode  
2 from the plurality of data transfer modes comprises:  
3 selecting the corresponding mode to be one from a group of access modes  
4 comprising READ and WRITE modes.

1 15. The method according to Claim 12, wherein one of the source device and the  
2 destination device comprises a memory device.

1 16. The method according to Claim 12, wherein enabling data transfer between

2 the source device and the destination device based on the corresponding channel and the  
3 corresponding mode comprises:

4 enabling the source device to read data from the destination device.

1 17. The method according to Claim 12, wherein enabling data transfer between  
2 the source device and the destination device based on the corresponding channel and the  
3 corresponding mode comprises:

4 enabling the source device to write data to the destination device.

1 18. A method of controlling data transfer between a first device and a second  
2 device, comprising:

3 receiving a command to initiate the data transfer;

4 extracting configuration data from the command to load a configuration

5 engine and to index operational characteristics associated with the

6 data transfer, the configuration engine being capable of storing the

7 operational characteristics;

8 selecting from the operational characteristics a channel facilitating the data

9 transfer between the first device and the second device, and an

10 operation mode associated with the data transfer;

11 receiving at least one signal indicating that the data transfer is ready to be

12 undertaken; and

13 enabling activation of the channel; and

14 enabling the data transfer using the operation mode selected.



2 the operation mode selected comprises:

3 selecting a starting address of a subsequent data transfer to be the base  
4 address.

1 25. The method according to Claim 23, wherein enabling the data transfer using  
2 the operation mode selected comprises:

3 selecting a starting address of a subsequent data transfer to be an address  
4 that is continuous with an ending address of a previous data  
5 transfer.

1 26. The method according to Claim 23, wherein enabling the data transfer using  
2 the operation mode selected comprises:

3 determining an ending address contiguous to the starting address; and  
4 automatically rolling the ending address to the starting address when the  
5 data transfer exceeds the ending address.

1 27. The method according to Claim 18, further comprising:

2 determining a segment count indicator and a segment spacing indicator  
3 from the operational characteristics, wherein the data transfer  
4 comprises data transfer of a plurality of data segments.

1 28. The method according to Claim 27, wherein enabling the data transfer using  
2 the operation mode selected comprises:

3 determining a base address representing a starting address of a first data

4 segment;  
5 selecting a starting address of a subsequent data segment to be an address  
6 determined from the base address offset based on the segment  
7 count indicator and the segment spacing indicator.

1 29. The method according to Claim 18, wherein receiving at least one signal  
2 indicating that the data transfer is ready to be undertaken comprises:  
3 receiving a request from the first device to READ data from the second  
4 device; and  
5 receiving a request from the second device to WRITE data to the first  
6 device.

1 30. The method according to Claim 29, wherein the operation mode comprises a  
2 virtual channel data transfer mode, and wherein enabling the data transfer using the  
3 operation mode selected comprises:  
4 sending an acknowledge signal to each of the first device and the second  
5 device; and  
6 enabling the data transfer to be performed directly between the first device  
7 and the second device.

1 31. A system, comprising:  
2 a source device communicatively coupled to a destination device; and  
3 coupled to the source and destination devices, means for selectively  
4 enabling multiple channel data transfer modes between the source



5 device and the destination device,  
 6 wherein a data transfer mode is selected from a group of the multiple  
 7 channel data transfer modes comprising fixed length single burst  
 8 mode, a chaining mode, an auto-rollback mode, a virtual channel  
 9 mode, and a multiple-segment mode.

1 32. The system according to Claim 31, wherein the means for selectively  
 2 enabling multiple channel data transfer operation modes between the source device and  
 3 the destination device comprises:

4 bus interface unit means for buffering bus signals between the source and  
 5 destination devices, the bus interface unit means being coupled to  
 6 the source and destination devices;  
 7 coupled to the bus interface unit means, memory means for storing  
 8 configuration data representing the multiple channel data transfer  
 9 operation modes; and  
 10 coupled to the memory means, engine means for selecting from the  
 11 memory means a corresponding operation mode and access mode  
 12 for the data transfer.

1 33. The system according to Claim 31, wherein the means for selectively  
 2 enabling multiple channel data transfer operation modes between the source device and  
 3 the destination device further comprises:  
 4 a processor coupled to a bus and interrupt controller, the bus and interrupt  
 5 controller being communicatively coupled to the bus interface unit

7

1

2

3

4.

5

6

7

8

9

10

11

12

1

2

3

4

5

6

7

8

22682/06323/DOCS/1206567.3

9  
10  
11  
12  
13  
14  
15  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15

\_\_\_\_\_



12 allowing receipt of at least one signal indicating that the data transfer is  
 13 ready to be undertaken; and  
 14 enabling activation of the channel; and  
 15 enabling the data transfer using the operation mode selected.

1 39. The method according to Claim 38, further comprising:  
 2 allowing receipt of a signal indicating a last transfer associated with the  
 3 data transfer; and  
 4 in response, enabling transmission of a signal acknowledging completion  
 5 of the data transfer.